

## REMARKS

The application has been amended to correct the cited informalities, to distinguish the claimed invention over the cited prior art, and to place the application, as a whole, into a *prima facie* condition for allowance. Substantial care has been taken to avoid the introduction of any new subject matter into the application as a result of the foregoing amendments.

Applicant again acknowledges, with appreciation, the Examiner's indications, that claims 24 - 30 are allowed, and that claims 11 - 23 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form, including all of the limitations of the base claim and any intervening claims.

In response thereto, Applicant has amended claim 11 to be in independent form, incorporating the subject matter of base claim 1, and intervening dependent claims 2 and 9. In view of the foregoing amendments, Applicant respectfully submits that amended, newly independent claim 11 patentably distinguishes over the cited prior art, and in accordance with the Examiner's prior indication of allowability, should be deemed allowable. Therefore, reconsideration and withdrawal of the objections to claim 11, and allowance thereof, are respectfully solicited.

Inasmuch as dependent claims 12 - 23 merely serve to further define the subject matter of amended, newly independent claim 11, which itself should be deemed allowable, dependent claims 12 - 23 likewise should be deemed to patentably distinguish over the cited prior art and therefore allowable. Accordingly, reconsideration and withdrawal of the objections to claims 12 - 23, and allowance thereof, are respectfully solicited.

Claim 6 has been objected to because of the following informality: the word "pas" should be correctly spelled "pad" at line 1 of the claim. In complete response thereto, Applicant has made the foregoing correction. Reconsideration and withdrawal of the objection to claim 6 are respectfully solicited.

In addition, upon review of the claims toward preparation of the instant Amendment and Communication, Applicant has noted, and subsequently corrected,

various informalities of punctuation, grammar, spelling or other minor nature, specifically in claims 10, 20, 24 and 27. Applicant submits that no new subject matter has been introduced into the claims as a result of the foregoing amendments, and entry and acceptance of the foregoing amendments are respectfully solicited.

Claims 1, 2, 7, 8 and 10 have been rejected under 35 U.S.C. 102(b) as being anticipated by *Lancaster*, US 4,750,189. Claim 1 has been rejected under 35 U.S.C. 102(b) as being anticipated by *Hayes*, US 5,067,094. Claims 3 - 6 have been rejected under 35 U.S.C. 103(a) as being unpatentable over *Lancaster*, US 4,750,189. Claim 9 has been rejected under 35 U.S.C. 103(a) as being unpatentable over *Lancaster*, US 4,750,189, in view of *Brunet*, US 6,799,452 B2. Applicant respectfully traverses the Examiner's substantive bases for rejection of the claims.

Applicant's invention is directed to an improved duct leak detection apparatus, wherein the improvements are in reliability and accuracy, and fidelity of the detection of leaks, as compared to prior art devices. The crucial aspects of the leak detection apparatus of Applicant's invention comprise a duct, an insulation blanket surrounding the duct, a shell surrounding the insulation layer, and, at intervals along the insulation blanket and insulation shell, cuffs (having generally U-shaped cross-sectional configurations) which are positioned around circumferential cuts in the insulation blanket and insulation shell. The cuffs join successive sections of the insulation blanket and insulation shell. The actual leak detection sensors are positioned to the outside of the respective cuffs, and the leaking air passes out of the respective cuffs through single, discrete substantially circular apertures, in each respective cuff. The reliability of leak detection devices is, at least in part, attributable to the structure, in which the cuffs are specifically configured to overlap the insulation shell, the insulation and the duct itself, collectively, in the vicinity of the cuts, the U-shaped cross-sectional configurations providing for a gap, in which the leaking air collects prior to escaping via the small, substantially circular apertures in the cuffs.

In *Lancaster et al.*, US 4,750,189, as can be seen in Fig. 6 thereof, "muff" 17 (which is analogous to "cuff" 10 of the instant application), has a "straight" cylindrical

cross-sectional configuration. But the insulation itself (and, in turn, the duct on one side and the insulation shell, on the other), is not overlapped by the "muff". Because the insulation itself is not overlapped by the muff, there is no need in the *Lancaster et al.* '189 reference, for the muff to have Applicant's U-shaped, convex cross-section to provide radial clearance for leaking air to accumulate. Furthermore, as is clearly seen in Fig. 6, and contrary to the Examiner's characterization of this reference, the "space" (actually, "leak directing apparatus") 16 is defined between muff 17, and the connected ends of duct portions 7b and 7c and coupling 11. Neither insulation 12a nor wrapper (insulation shell) 12b extend into this space. Therefore, there is no "void" between muff 17 and wrapper 12b, as set forth in claim 1 of the instant application, as amended. In the *Lancaster et al.* '189 patent, the leaking gases are simply passed out through an elongated slot in the muff, and only generally directed toward the temperature sensitive wire, with a substantial air gap between the slot and the wire. This structure is analogous to attempting to blow out a candle from several feet away, with a similarly reduced accuracy, reliability and fidelity of detection. This is in contrast to the structure of Applicant's apparatus, in which the gases are affirmatively directed, via the aperture in the cuff, and the boreholes in manifold 30, directly against the temperature sensitive wires.

In *Hayes*, US 5,067,094, an apparatus for detecting leaks in steam-bearing ducts in, e.g., nuclear or fossil fueled power plants is shown. In this apparatus, temperature-sensing thermocouples are positioned directly against the outside surface of a pipe, underneath the insulation layer. The temperature of the pipe is used in an algorithm to infer the rate of leak from an in-line valve located downstream of the site of the thermocouples. Again, contrary to the Examiner's characterization of the , steel band 42 is not a cuff bridging a gap between portions of insulation, because it is below (i.e., radially inward of) the insulation. Rather, steel band 42 is used to hold the thermocouples in place (see col. 3, lines 27 - 34). Note that Fig. 3 of the reference contains an error; reference numeral 14 in Fig. 3 should actually be "44", representing the straps that hold the wires for the thermocouples in place. See col. 3, line 32. Even

assuming for the sake of argument that band 42 is equivalent to a cuff, it is positioned radially between the insulation and the pipe, and so any space surrounded by the band 42 is between the band and the pipe, and not between the band, on the one hand, and the duct, insulation and insulation shell, collectively, on the other.

Furthermore, this reference is directed to an apparatus for detecting leaks in valves which are in the line of the fluid path, not leaks arising from, e.g., cracks in the actual pipe itself. There is no air flow at the locations where the thermocouples are situated, as the thermocouples are measuring the temperature of the surface of the pipe itself. The suspected leaking valves themselves are positioned downstream of the locations of the thermocouples (see col. 4, lines 1 - 5). As there are no circumferentially extending gaps in the insulation blanket either shown or suggested in the reference, there is no teaching or suggestion of a discrete, radially extending circumferential void between a cuff and the duct, the insulation, and the insulation shell, collectively, as required by claim 1, as amended, of the instant application.

In view of the foregoing, Applicant respectfully submits that Applicant's invention of amended claim 1 patentably distinguishes over the cited Lancaster et al. and Hayes references. Therefore, Applicant submits that the Examiner's substantive bases for rejection of amended claim 1 should be deemed overcome. Reconsideration and withdrawal of the rejection of claim 1, based on the Lancaster et al. and Hayes references, and allowance of claim 1 thereover, are respectfully solicited.

Inasmuch as dependent claims 2 - 10 merely serve to further define the subject matter of amended independent claim 1, which itself should be deemed allowable, reconsideration and withdrawal of the rejections of claims 2 - 10, and allowance thereof, are respectfully solicited.

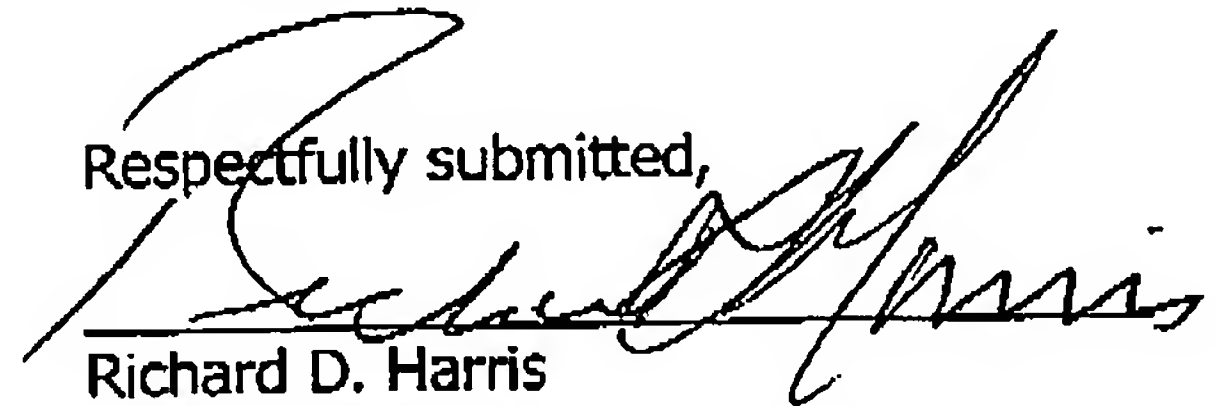
In view of the foregoing, Applicant respectfully submits that all of the Examiner's substantive bases for rejection of the claims should be deemed overcome, and reconsideration and withdrawal of the rejections to the claims, and allowance thereof, are respectfully solicited.

Applicant submits that the application as a whole, including all of claims 1 - 30, is now in prima facie condition for allowance, and reconsideration and allowance of the application are respectfully solicited.

Should anything further be required, a telephone call to the undersigned at (312) 456-5019 is respectfully requested.

Dated: February 16, 2006

Respectfully submitted,

  
Richard D. Harris  
One of attorneys for applicant

**CERTIFICATE OF FACSIMILE TRANSMISSION**

I hereby certify that this AMENDMENT AND COMMUNICATION is being transmitted via telecopier, to Examiner Michael Cygan, Art Unit 2855, United States Patent and Trademark Office, to telecopier number 571-273-8300, on 2-16-06.

*Douglas B. Stearns*